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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/955,722	09/18/2001	Kenneth A. Peterson	SD6436. 1/S97675	1517
7590	12/18/2003		EXAMINER	
Timothy D. Stanley Sandia National Laboratories P. O. Box 5800 - MS-0161 Albuquerque, NM 87185-0161			LEE, EUGENE	
			ART UNIT	PAPER NUMBER
			2815	

DATE MAILED: 12/18/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No.	Applicant(s)
	09/955,722	PETERSON ET AL.
	Examiner	Art Unit
	Eugene Lee	2815

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on 25 September 2003.
- 2a) This action is FINAL.                            2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 1-14, 17-30 and 35-44 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) Claim(s) \_\_\_\_\_ is/are allowed.
- 6) Claim(s) 1-14, 17-30 and 35-44 is/are rejected.
- 7) Claim(s) \_\_\_\_\_ is/are objected to.
- 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on \_\_\_\_\_ is/are: a) accepted or b) objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. §§ 119 and 120

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) All    b) Some \*    c) None of:
1. Certified copies of the priority documents have been received.
2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 13) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
- a) The translation of the foreign language provisional application has been received.
- 14) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

#### Attachment(s)

- 1) Notice of References Cited (PTO-892)                            4) Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_ .
- 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)                    5) Notice of Informal Patent Application (PTO-152)
- 3) Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_ .                    6) Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 9/25/03 has been entered.

### ***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1 thru 14, 17 thru 27, and 35 thru 42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kao et al. 5,923,995 in view of Wu et al. "Interface-Adhesion-Enhanced Bi-layer Conformal Coating for Avionics Application". Kao discloses (see, for example, FIGURE 2C) a wafer 300 comprising micromechanical systems (sensitive area) 310, and a protective layer (temporary protective coating) 320. In FIGURE 2D, Kao shows the wafer being diced and the water insoluble protective layer subsequently removed. In step 570 of FIGURE 5 and column 7, lines 34-44, Kao discloses that bond pads connect to the leads of a lead frame. Kao does not disclose the protective coating as being insoluble in organic solvents. However, Wu discloses a protection for micromechanical systems wherein a bi-layer conformal coating comprising

parylene C (insoluble in organic solvents) is used to protect a sensitive device. In the abstract, Wu teaches that such a conformal coating protects a MEMs device from adverse environmental conditions. Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to use this bi-layer conformal coating in order to protect the micromechanical systems of Kao.

Regarding claims 10-14, 17, and 19, Kao discloses the claimed invention except for the specific materials of the protective coating that protect a sensitive area on a wafer. Kao simply states the material used to protect the micromechanical system “may be composed of any substantially insoluble material known to those of ordinary skill in the art.” See column 5, lines 1-5. The use of conventional materials to perform their known functions in a conventional process is obvious. *In re Raner* 134 USPQ 343 (CCPA 1962). Kao teaches that any conventional material can be used that is known to be capable of protecting underlying layers, which could include any of those materials listed in claims 10-14, 17 and 19. Furthermore, as chemical composition of the protective layer does not seem to be critical to the invention, it must be shown that any one or all of the listed materials yield an **unexpected** product or result. *In re Margolis* 228 USPQ 940 (Fed. Cir. 1986); *In re Kirsch* 182 USPQ 286 (CCPA 1974); *In re Sueher* 181 USPQ 36 (CCPA 1974); *In re Costello* 178 USPQ 290 (CCPA 1973); *In re Von Schickh* 150 USPQ 300 (CCPA 1966); *In re Sussman* 60 USPQ 538 (CCPA 1944); *In re Kaplan* 45 USPQ 175 (CCPA 1940).

4. Claims 1, 7 thru 14, 17 thru 19, 21 thru 27, and 35 thru 42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Degani et al. 5,516,728 in view of Wu et al. “Interface-

Adhesion-Enhanced Bi-layer Conformal Coating for Avionics Application". Degani discloses (see, for example, FIG. 2) a substrate (wafer) 10 comprising a device (sensitive area) 20 and protective coating 65 formed thereon. The wafer is subsequently diced and the protective coating remains on the substrate during the dicing process. The protective coating itself is removed from the substrate after the dicing process. Degani does not disclose the protective coating as being insoluble in organic solvents. However, Wu discloses a protection for micromechanical systems wherein a bi-layer conformal coating comprising parylene C (insoluble in organic solvents) is used to protect a sensitive device. In the abstract, Wu teaches that such a conformal coating protects a MEMs device from adverse environmental conditions. Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to use this bi-layer conformal coating in order to protect the device of Degani.

5. Claims 1 thru 14, 17 thru 19, 21 thru 27, and 35 thru 42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kaeriyama et al. 5,872,046 in view of Wu et al. "Interface-Adhesion-Enhanced Bi-layer Conformal Coating for Avionics Application". Kaeriyama discloses (see, for example, FIG. 1) a semiconductor wafer 10 comprising a resist layer (temporary protective layer) 20 and micromechanical structures (sensitive area) 16. In FIG. 3, Kaeriyama discloses the wafer as being diced (step 42) and the resist layer subsequently removed (see, for example, column 6, lines 54-60). In column 5, lines 61-65, Kaeriyama discloses the structures 16 could be accelerometers, micromotors, or for use in biological or chemical sensors. Kaeriyama does not disclose the protective coating as being insoluble in organic solvents. However, Wu discloses a protection for micromechanical systems wherein a bi-layer conformal

coating comprising parylene C (insoluble in organic solvents) is used to protect a sensitive device. In the abstract, Wu teaches that such a conformal coating protects a MEMS device from adverse environmental conditions. Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to use this bi-layer conformal coating in order to protect the micromechanical structures of Kaeriyama.

6. Claims 28 thru 30, 43 and 44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kao et al. 5,923,995 in view of Wu et al. "Interface-Adhesion-Enhanced Bi-layer Conformal Coating for Avionics Application" as applied to claims 1-14, 17-27, and 35-42 above, and further in view of Smith et al. 5,766,367. Kao does not disclose a performance-enhancing coating disposed on the released MEMS element. However, Smith discloses (see abstract) applying a chemical species (performance-enhancing coating) to micromechanical structures in order to prevent adhesion with other objects. Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to include the chemical species (performance-enhancing coating) to the micromechanical system of Kao in view of Wu in order to prevent the device from adhering to other objects.

#### ***Product-by-Process Limitations***

While not objectionable, the Office reminds Applicant that "product by process" limitations in claims drawn to structure are directed to the product, *per se*, no matter how actually made. *In re Hirao*, 190 USPQ 15 at 17 (footnote 3). See also, *In re Brown*, 173 USPQ 685; *In re Luck*, 177 USPQ 523; *In re Fessmann*, 180 USPQ 324; *In re Avery*, 186 USPQ 161; *In re*

*Wethheim*, 191 USPQ 90 (209 USPQ 554 does not deal with this issue); *In re Marosi et al.*, 218 USPQ 289; and particularly *In re Thorpe*, 227 USPQ 964, all of which make it clear that it is the patentability of the final product *per se* which must be determined in a “product by process” claim, and not the patentability of the process, and that an old or obvious product produced by a new method is not patentable as a product, whether claimed in “product by process” claims or *otherwise*. Note that applicant has the burden of proof in such cases, as the above case law makes clear. Thus, no patentable weight will be given to those process steps, which do not add structural limitations to the final product.

In the claims, the applicant states a **temporary** protective coating, however, this structure is **not** part of the final product, but is only an intermediate structure used to form a final product of a sensitive area on a wafer. The temporary protective coating does not add any structural limitations to the sensitive area but only serves as a protective structure while the wafer is being formed. See, for example, FIG -1D wherein applicant shows the final product of a sensitive area 12 on a device 10. The temporary coating is removed and therefore only serves as a method step to forming the final structure.

#### ***Response to Arguments***

7. Applicant's arguments with respect to claims 1-14, 17-30 and 35-44 have been considered but are moot in view of the new ground(s) of rejection.

Regarding Issue #1 stated in the amendment filed 9/25/03 that Wu does not teach a vapor-deposited protective layer that is insoluble in water or organic solvents, which is directly in contact with sensitive area, this argument is not persuasive. Wu teaches a bi-layer conformal

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coating comprising silicone elastomer and parylene. The silicone elastomer (i.e. a type of rubber) is insoluble in water or organic solvents and is a layer that directly contacts a MEMs device or sensitive area. The limitation “vapor-deposited” is a method limitation that does not add any structural limitations to the applicant’s claims.

Regarding Issue #2 that the Office has failed to present any line of reasoning, specific understanding or principle within knowledge of skilled artisan or objective evidence that teaches, suggests or motivates why a person of ordinary skill in the art would make the combination of Kao et al. and Wu et al., this argument is not persuasive. The Office has provided a clear line of reasoning to combine Kao and Wu. Kao discloses a MEMs device. Wu discloses (see abstract) a bi-layer conformal coating that protects MEMs devices. Therefore it would have been obvious to one of ordinary skill in the art at the time of invention to combine Kao in view of Wu in order to protect Kao’s MEMs device.

Regarding Issue #3 that Kao teaches away from using a water insoluble material as a protective layer directly in contact with released MEMS structures, this argument is not persuasive. Kao simply discloses a micromechanical device that is encapsulated by an exterior protective layer. The combination with Wu is not based on hydrodynamic forces or the processing needed to realize a released MEMs structure, rather, the combination is based on whether a bi-layer conformal coating made of parylene can protect a MEMs device. Clearly, based on Wu’s disclosure, it can. In addition, the claims state a protective coating directly contacting and covering a sensitive area and not what happens after the coating is removed, therefore, the argument that Kao teaches a water soluble material that would not need

environmentally unfriendly solvents is not persuasive since the effect of unfriendly solvents would only appear after the coating is removed, which is not present in the claims.

#### **INFORMATION ON HOW TO CONTACT THE USPTO**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eugene Lee whose telephone number is 703-305-5695. The examiner can normally be reached on M-F 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie C. Lee can be reached on 703-308-1690. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

Eugene Lee  
December 17, 2003

*Tom Thomas*